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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|---|---|---|---|---|
| 09/527,873 | 03/17/2000 | Sohaila Shooshtarian | AGX-37 | 4182 |

7590 01/14/2003

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|---|---|
| LEE, HSIEN MING | |
| **ART UNIT** | **PAPER NUMBER** |
| 2823 | 23 |

DATE MAILED: 01/14/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

| Office Action Summary | Application No. 09/527,873 | Applicant(s) SHOOSHTARIAN ET AL. |
|---|---|---|
| | Examiner ~~W. David Coleman~~ HSIEN MING LEE | Art Unit 2823 |

*-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --*

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

1)☒ Responsive to communication(s) filed on *22 October 2002* .

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

4)☒ Claim(s) *1,2,4-13 and 42-48* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,2,4-13,42 and 44-48* is/are rejected.

7)☒ Claim(s) *43* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

**Application Papers**

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

**Priority under 35 U.S.C. §§ 119 and 120**

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

**Attachment(s)**

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) *21* .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

## DETAILED ACTION

### *Response to Arguments*

1. Applicant's arguments filed October 22, 2002 have been fully considered but they are not persuasive.

2. Applicants contend that Thakur et al., U.S. Patent 5,926,742 in view of Gilchrist et al., U.S. Patent 5,846,375 that one of ordinary skill in the art would not have found it obvious to combine the above-cited references because of the vast differences in the types of heating systems.

3. In response to Applicants contentions that there are vast differences in the heating systems of Thakur and Gilchrist, please note that the support for Gilchrist lies in the reasoning that Claim 1 recites a heating stage, which was lacking in Thakur. In response to applicant's argument that there is no suggestion to combine the references, the examiner recognizes that obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. See *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988)and *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992). In this case, the heating stage of Gilchrist can selectively control the localized temperature of at least one localized region of the semiconductor wafer.

**Claim Rejections - 35 USC § 103**

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. Claims 1, 4, 5, 8-13, 42, 44, 45 and 47 are rejected under 35 U.S.C. 103(a) as being unpatentable over Thakur et al. (US 5,926,742) in view of Gilchrist et al. (US 5,846,375).

6. Thakur et al. in Figs. 4, 5 and related text expressly and impliedly teaches the claimed method for heat treating a semiconductor wafer, comprising : placing a semiconductor 10 in a thermal processing chamber 12 that is in communication with a plurality of lamps 18 ( tungsten-halogen lamps), the semiconductor wafer 10 defining a plurality of localized regions ( Fig. 5) along a radical axis, adjusting the temperature of the semiconductor wafer 10 to a predetermined temperature according to a predetermined heat cycle including a heating stage in which the semiconductor wafer is heated by the plurality of lamps 18 and the radiation energy generated by the lamps can be selectively varied, during at least one stage of the predetermined heat cycle, providing a gas through gas injection head 22 having multiple through-hole to minimize temperature deviation of the at least one localized region from the predetermined temperature. The localized regions comprises less than about 50% or 25% or 15% of a cross-section of the wafer. The predetermined heat cycle comprises a cooling stage.

7. Thakur et al fail to teach selectively controlling the localized temperature of at least one localized regions of the semiconductor wafer. Gilchrist et al., in an analogous art of heat treating a semiconductor wafer teach heating the wafer which is mounted on the surface of a chuck 14.

wherein the chuck 14 has a series of embedded conduits 32a, 32b, 32c, 32d, (Fig. 11). The fluid including heating gas (col. 5, lines 10- 11) can be flown into the series of embedded conduits 32a, 32b, 32c, 32d to selectively control the localized temperature of at least one localized regions of the semiconductor wafer because each of conduits is independently controlled (col. 2, lines 63-65). As well as a method as defined in claim 1, wherein said gas used to selectively control the temperature of at least one of said localized regions is supplied by a device located below said semiconductor device.

8. Therefore, at the time of the invention was made, one artisan in the art would have been motivated to modify the gas injection unit of Thakur et al. using the selectively-controlled-type gas injection unit of Gilchrist et al for the purpose of heat treating the semiconductor wafer since by this manner it would able to selectively control the localized temperature of localized regions of the semiconductor wafer, which in turn would minimize temperature deviation from a predetermined temperature.

9. Claims 2, 6 and 7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Thakur et al. and Gilchrist et al. as applied to claims 1, 4, 5, 8-13 above, and further in view of Moslehi US 5,436,172) and applicants' admitted prior art (page 3, second paragraph).

Regarding claim 2, the combination of Thakur et al. and Gilchrist et al. substantially teach the claimed method but fails to teach monitoring the temperature of the localized regions with a temperature sensor in communication with a controller and based on information received by the controller from the temperature sensor controlling the temperature according to the predetermined heat cycle. Moslehi in an analogous art of heat treating a wafer teach utilizing a temperature sensor in communication with a controller to effectively control the temperature

based on the information received by the controller (Figs. 2, 10, 18, 19, 22-23 and col. 3, line 48 through col. 4, line 5).

10. Therefore, at the time of the invention was made, one artisan in the art would have been motivated to utilize the temperature sensor and the controller of Moslehl in conjunction with the heating method of Thakur et al. and Gilchrist et al. for heat treating the wafer since by doing so it would able to effectively control temperatures in a real-time basis and thus to minimize temperature deviation.

11. Regarding claims 6 and 7, the combination of Thakur et al. and Gilchrist et al. does not expressly disclose that the temperature deviation is less than about 100C or about 25C. However, it would have been obvious to one of the ordinary skill in the art to appreciate that in a conventional process of heat treating the wafer the temperature deviation on the wafer need to be controlled far less than 25C during the heating and cooling stages, as evidenced by applicants' admitted prior art, in which the prior art teaches that in a conventional heat treating process the localized temperature deviation is controlled about 5 C ( page 3, lines 7-9 ), which is within the claimed range.

12. Regarding claims 44, 45 and 48, no weight has been given to the location features of the apparatus since Applicants have elected method claims. Please note that in class 438, the class definition provides for manufacturing a semiconductor device and is not dependent on location features of the apparatus.

**Objections**

13. Claim 43 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

***Conclusion***

14. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL.** See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

15. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Hsien-Ming Lee whose telephone number is 703-305-7341. The examiner can normally be reached on M-F (9:00 - 5:00).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Olik Chaudhuri can be reached on 7031-306-2794. The fax phone numbers for the organization where this application or proceeding is assigned are 703-305-0142 for regular communications and 703-305-0142 for After Final communications.

Any inquiry of a general nature or relating to the status Of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0956.

Olik Chaudhuri
Supervisory Patent Examiner
Technology Center 2800